Table 3

Author, date and country	*Patient group*	*Study level*	*Outcomes*	*Key results*	*Study weakness*
Lindmarker P and Holmstrom M, 1996, Sweden[1]	434 patients with symptomatic DVT, 239 proximal, 195 distal Patients were followed up for 3 months	Cohort	Recurrent DVT, incidence of pulmonary embolus, bleeding events, death	Frequency of major events during the administration of LMWH was 0.92% with an exact 95% CI of 0.25, 2.35% During the 3 month follow up period there were 3 reoccurrences and 1 PE There were no deaths during initial treatment with LMWH	High incidence of distal DVT (45%) may have affected the complication rate
Mattiasson I, *et al*, 1997, Sweden[2]	523 consecutive patients from 6 hospitals Patients followed up for 3 months	Cohort	Any bleeding event, pulmonary embolus (PE), progression of thrombus Eligibility	No serious bleeding event was reported. No serious thromboembolic complication was noted. 197/523 (38%) were deemed suitable (according to criteria) for total outpatient care 43 (8%) were initially hospitalised but then discharged after a median of 2 days	Excluded patients with thrombus involving the v iliaca and v cava This may reflect the zero incidence of PE
Grau E, *et al*, 1998, Spain[3]	71 consecutive patients presenting to the ED with a DVT (56 proximal, 15 calf) Patients were assessed monthly for 6 months	Cohort	Recurrent venous thromboembolic event (VTE) Ambulatory care	No patients had VTE recurrence during the 6 months of follow up. Ambulatory care was feasible in 39 (55%) of patients. 24 of these were not hospitalised at all and the remaining 15 were discharged within 2 days	Small number of patients
Groce B, 1998, USA[4]	125/142 patients with acute proximal DVT	Cohort	Length of stay Recurrent DVT Bleeding	From 5.4 to 0.97 days. 84 patients were in hospital ≤24 hours. The remaining 41 stayed between 1.1 and 3 days 1/125 In 2/125	Preliminary results
Harrison L, *et al*, 1998, Canada[5]	89/113 consecutive patients 69 had proximal DVT, 11 calf vein DVT, 7 had upper extremity DVT, 2 had PE Patients were followed up at 3 months after initial diagnosis	Cohort	Bleeding episode Recurrent VTE Patient satisfaction	There was 1 bleeding episode requiring admission 5 cases of recurrent VTE were reported (all had malignant disease) 1 death was reported 75/82 (91%) were pleased at home treatment	Some patients were followed up at 3 months over the telephone, which may affect validity of findings Possibility that satisfaction questionnaire not validated
Ting S, *et al*, 1998, Australia[6]	100 consecutive patients with acute lower limb DVT (53 proximal, distal 47) Patients were followed up for 6 months	Cohort	Bleeding Recurrent VTE PE	6 minor bleeding complications. In 2 of these Dalteparin was stopped 4 patients had reoccurrence between 5–12 months No episodes of symptomatic PE reported	
Wells P, *et al*, 1998, USA[7]	194/233 patients presenting with DVT were recruited into 2 care models Patients were followed up for 6 months	Cohort	Recurrent VTE Bleeding events	The overall recurrent event rate was 3.6% (95% CI 1.5%, 7.4%) The overall rate of major haemorrahge was 2.0% (95% CI 0.6%, 5.2%) More than 184/194 patients were treated mainly at home	As patients were cared for in a highly supervised research setting, evidence of their satisfaction/anxiety with the service could have been assessed
Yusen D, *et al*, 1999, USA[8]	195 hospitalised patients diagnosed as having a proximal DVT were assessed for outpatient treatment.	Cohort	Recurrent VTE, major bleeding, death Eligibility	No complications were recorded in any of the 36 eligible or possibly eligible patients Of the 159 patients classified as ineligible, 13 (8%; 95% CI 4%, 12%) died or developed serious complications	Criteria applied retrospectively Lack of documentation may have limited the ability to determine accurate complication rates

1 Lindmarker P, Holmstrom M. Use of low molecular weight heparin (Dalteparin), once daily for the treatment of deep vein thrombosis. A feasibility and health economic study in an outpatient setting. *J Intern Med* 1996;**240**:395–401.
2 Mattiasson I, Berntorp S, Bornhov S, *et al*. Out patient treatment of acute deep vein thrombosis. *Int Angiol* 1998;**17**:146–50.
3 Grau E, Real E, Pastor E, *et al*. Home treatment of deep vein thrombosis: a two years experience of a single institution. *Haematologica* 1998;**83**:438–41.
4 Groce J. Patient outcomes and cost analysis associated with an outpatient deep vein thrombosis treatment program. *Pharmacotherapy* 1998;**18**:175–80S.
5 Harrison L, McGinnis J, Crowther N, *et al*. *Arch Intern Med* 1998;**158**:2001–3.
6 Ting S, Ziegenbein R, Gan TE, *et al*. Dalteparin for deep vein thrombosis: a hospital in the home programme. *Med J Aust* 1998;**168**:272–6.
7 Wells P, Kovacs M, Boramis J, *et al*. Expanding eligibility for outpatient treatment of deep vein thrombosis and pulmonary embolism with low molecular weight heparin. A comparison of patient self-injecting with homecare injection. *Arch Intern Med* 1998;**158**:1809–12.
8 Yusen R, Haraden B, Gage B, *et al*. Criteria for outpatient management of proximal lower extremity deep vein thrombosis. *Chest* 1999;**115**:972–9.

SimpliRed D-dimer assay in suspected pulmonary embolus

Report by Magnus Harrison, *Research Fellow*
Search checked by Steve Jones, *Research Fellow*

Clinical scenario

A 40 year old man presents with acute suspected pulmonary embolus (PE). You wonder whether a negative SimpliRed D-dimer assay is sufficient to rule out the diagnosis of PE.

Three part question

In [a patient suspected of having an acute pulmonary embolus] is [a negative SimpliRed d-dimer assay] able to [rule out PE]?

Table 4

Author, date and country	*Patient group*	*Study type*	*Outcomes*	*Key results*	*Study weaknesses*
Ginsberg JS, *et al*, 1998, Canada[1]	Over 18s clinically suspected PE, referred to TE consultant	Prospective cohort	Sensitivity and specificity LRs	Whole group SimpliRED: sensitivity 84.8% specificity 68.4% LR+ 2.7 LR− 0.22 In Low PTP Sens 79% Spec 75% LR− 0.27	Follow up not same in all groups. For subgroup analysis only LR−ve given, no sensitivity or specificity No further identification of patient's presenting problem No sample size calculation No CIs given
De Groot M, *et al*, 1999, Netherlands[2]	In patients and outpatients suspected of PE	Prospective management study	False –ve D-dimer results	10% of normal SimpliRED results had PE that is, 90% sensitivity	Incorporation bias RS not universally applied No sample size calculation No CIs given
Farrell S, *et al*, 2000, USA[3]	Consecutive patients referred from ED for ?DVT and PE	Prospective clinical trial	Sensitivity PVs LRs	PE +ve 32.8% Sens 68% 95% CI 54, 83% Spec NPV 83% 95% CI 75, 91% LR−ve 0.42 95% CI 0.26, −0.66	RS not applied to all patients Wide CIs
Ginsberg JS, *et al*, 1995, Canada and Netherlands[4]	Patients referred to TE consultant, suspected of acute PE	Prospective cohort	Sensitivity and specificity PVs	PE +ve 19% Sens 94% 95% CI 70, 99% Spec 66% 95% CI 53, 77% NPV 98% PPV 38%	RS not applied to all patients Large CIs, therefore need verification in a more powerful study

Search strategy

Medline 1966–07/00 using the OVID interface. [{(Exp pulmonary embolism or pulmonary embolism.mp) OR {(pulmonary.mp.) AND (exp embolism OR embolism$.mp.)} OR (exp thromboembolism or thromboembolic.mp.)] AND (Simplired$ OR exp fibrin fibrinogen degredation products or d-dimer$.mp)].

Search outcome

Altogether 172 papers were found of which 162 were irrelevant and six of insufficient quality for inclusion. The remaining four papers are shown in table 4.

Comments

The "gold standard" investigation for the diagnosis of PE is pulmonary angiography. However, the universal application of this investigation in all patients, in any clinical trial for the investigation of PE, is unethical; the morbidity and mortality associated with this investigation are unacceptably high. Therefore most research is conducted using decision making analysis tools; this would be acceptable if all study patients are subject to the same diagnostic tests. If this does not happen, the validity of the results can be questioned. In the above trials, where the confidence intervals are given, the width of the interval is large; this could be remedied with a larger more powerful trial. As they stand, the confidence intervals are too wide.

Clinical bottom line

SimpliRed does not have the required sensitivity to be used to rule out PE in an ED setting.

1 Ginsberg JS, Wells RS, Brill-Edwards P, *et al*. Sensitivity and specificity of a rapid whole-blood assay for d-dimer in the diagnosis of pulmonary embolism. *Ann Intern Med* 1998;**129**:1006–11.
2 De Groot M, van Marwijk Kooy M, *et al*. The use of a rapid d-dimer blood test in the diagnostic work-up for pulmonary embolism: a management study. *Thromb Haemost* 1999;**82**: 1588–92.
3 Farrell S, Hayes T, Shaw M. A negative SimpliRED d-dimer assay result does not exclude the diagnosis of deep vein thrombosis or pulmonary embolus in emergency department patients. *Ann Emerg Med* 2000;**35**:121–5.
4 Ginsberg JS, Wells RS, Brill-Edwards P, *et al*. Application of a novel and rapid whole blood assay for d-dimer in patients with clinically suspected pulmonary embolism. *Thromb Haemost* 1995; **73**:35–8.

Elastic compression stockings and the risk of post-thrombotic syndrome in patients with symptomatic proximal vein thrombosis

Report by Beverley Lane, *Research Nurse*
Search checked by Steve Jones, *Research Fellow*

Clinical scenario

A 35 year old woman attends the emergency department with a swollen and painful left leg. A DVT is suspected and confirmed on ultrasound. You are aware of the possible risks of developing post-thrombotic syndrome and